

## Sinus Bradycardia and Hypotension Following Reconstructive Hemi Mandibulectomy. Unusual Complication of Orofacial Reconstructive Surgery

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Postoperative complications following pectoralis major myocutaneous flap in orofacial reconstruction are a well-known entity. Still, literature search didn't reveal sinus bradycardia as one of those post-operative complications. One of our patients, a 63-year-old gentleman with squamous cell carcinoma in the right cheek, who underwent wide local excision with right side hemimandibulectomy and pectoralis major myocutaneous flap reconstruction, developed symptomatic sinus bradycardia and hypotension as a postoperative complication. Initially there was a struggle to find out the underlying cause but later, carotid sinus hypersensitivity was suspected as a probable cause. Ultimately, it was alleviated by a debulking surgery to reduce the pressure in the neck.

**Key words:** sinus bradycardia, complication, orofacial reconstruction, negative chronotropic effect, carotid sinus hypersensitivity, neck surgeries

### Case History

A 63-year-old known patient with chronic obstructive pulmonary disease had been diagnosed to have a squamous cell carcinoma in the cheek. A full course of chemotherapy and radiotherapy were given and surgery was planned. Prehabilitation was done in collaboration with multi-disciplinary team. Percutaneous endoscopic gastrostomy feeding tube was inserted because of difficulty in mouth opening and swallowing. Difficult airway was predicted during preoperative anaesthetic assessment, and awake fiber optic intubation was decided. On admission for surgery, his heart rate (HR) was 68/minute and blood pressure (BP) was 110/65 mmHg. Other vital signs were also normal.

The patient was anaesthetized and intubated following awake fiber optic intubation. Wide local excision, hemimandibulectomy and pectoralis major myocutaneous flap reconstruction was done.

Patient was transferred to intensive care unit unextubated for postoperative care.

On first postop day, his BP was marginal (110/60 mm Hg) with 60 beats/minute of HR. Next day morning, he was extubated. Later, sinus bradycardia (HR of 45 to 55 bpm) and hypotension 70-75/40-50 mmHg were noted. Both transiently improved with bolus doses of atropine and deteriorated after few minutes. Patient was adequately hydrated. No electrolyte disturbances were noticed. Cardiologist's opinion was sought and echocardiography was normal. Cardiologist suggested to commence dopamine infusion, which was started and escalated to maximum dose, but there was no significant improvement. Therefore, dobutamine infusion was commenced and dopamine infusion was de-escalated. Subsequently BP increased to 80/50 mm Hg, but HR was around 60/minute. He complained of giddiness during mobilization. Since there was not significant improvement, inotropes were tailed off following cardiologist's opinion.

HR and BP improved when he turned his head to right side (surgery was done on same side). Discussion went on the possibility of vagus nerve or carotid sinus stimulation because of local pressure. After the removal of some skin sutures, HR and BP improved marginally. Based on that, surgeon planned to do debulking surgery to release the local pressure. Debulking surgery and

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sternocleidomastoid muscle removal were done under general anaesthesia. Subsequently, his HR improved to 55 to 60 beats/minute and SBP improved to 95-110 mmHg. Next day patient was transferred to ward and discharged home in one week without any significant complications.

### Discussion

There are some possible systematic mechanisms that could be deduced to explore this rare case of bradyarrhythmia. Commonest causes within the instantaneous postoperative care of any surgery, like acute coronary syndrome and electrolyte imbalances were excluded by doing relevant investigations. Another possibility is damage to middle cervical sympathetic ganglion (MCG) intra-operatively. Numerous research studies have proved that MCG has a major contribution to the thoracic sympathetic nervous system and hence to the HR regulation.<sup>2</sup> Usual location of MCG is at C5–C7 level, in front of the muscle of longus colli. But this has numerous anatomical changes, which must be considered. Small scale, oval shape and presence of similar looking lymph nodes makes it vulnerable to injury during neck operations.<sup>2</sup> Extensive neck dissection can damage the bilateral MCG and it would result in bradycardia. In this patient the surgery was unilateral. Therefore, it is unlikely to be the cause.

Lastly, carotid sinus hypersensitivity can be a cause for post operative bradycardia. Malignancies in both head and neck can generate negative chronotropic and inotropic cardio vascular events perioperatively.<sup>2</sup> Carotid sinus hypersensitivity could be caused due to injury to the sinus by compression or tumor invasion or mechanical injury during surgery.<sup>3</sup> Carotid hypersensitivity is categorized into three main types. The first cardio inhibitory type is the negative chronotropic effect causing sinus bradycardia. The second type is vasodepressor type causing hypotension and the third type is a mixed type but rarely seen.<sup>3</sup>

In our case, patient developed bradycardia and hypotension acutely in the postoperative period. We excluded the common causes. HR and BP did not significantly improve with inotropes, but responded only to atropine boluses. We suspected

that local pressure might be the cause because HR and BP slightly increased when he turned his head to right side, reducing the right sided neck tightness. Even though the surgery was not close to the carotid sinus, the pectoralis major myocutaneous flap might have caused pressure on it. Previous radiotherapy and lean body built might have attributed to reduced space and increased pressure in his neck. Local pressure acted like continuous carotid sinus massage causing a reflex bradycardia. Debulking surgery and sternocleidomastoid muscle removal were performed relieving the tight neck compartment and pressure on the carotid and patient's HR and BP improved without any other significant complications.

### Conclusion

This patient faced symptomatic bradycardia and hypotension following a flap reconstruction surgery due to compression of the carotid sinus by the pressure caused by the flap. Both intraoperative and post operative close cardiac monitoring in neck surgeries should be further emphasized.

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